1. ABSTRACT

Galactic Finance ("Galactic") is a decentralized, permissionless, and zero-slippage synthetic asset issuance and liquidity DeFi protocol built on Ethereum. It primarily acts as a Decentralized Exchange (DEX) that adopts a peer-to-contract design, facilitating users to speculate and gain portfolio exposures on real world and digital assets by creating corresponding synthetic assets that track their real-time prices via decentralized oracles.

The backbone of Galactic’s protocol design is the collateralized Debt Pool, which can be backed by multiple selected other major cryptocurrencies as collateral assets. The multi-asset collateral pool enhances the Galactic system’s inclusiveness, and protects the system against single cryptocurrency risks and improves system stability.

Users that stake collaterals to the Collateralization Pool will be able to mint synthetic assets (Gals), which can be converted to Gals that represent different underlying assets without the need of a counterparty. For example, a user that stakes ETH to mint gUSD (a stablecoin), will be able to convert gUSD to gTSLA (a Gal that represents Tesla’s stock price) based on a real-time conversion rate that is fed through a price oracle. The peer-to-pool design resolves the liquidity and slippage issues that are currently present on AMM-based DEXs.
In addition, Galactic has a built-in dual-step liquidation mechanism, through which risky debt positions are secured by i) gUSD reserves in the Stability Pool, and ii) a redistribution mechanism that redistributes risky debt positions and the associated collateral assets to much safer debt positions. As a result, Galactic requires much lower collateralization ratios than competing synthetic protocols, significantly enhancing user’s capital efficiencies.

Finally, in order to achieve true decentralization and enhance censorship resistance, Galactic plans to decentralize and incentivize its frontend operations to 3rd party frontend operators via a series of API and advanced open-sourced applications. Galactic also intends to enable the permissionless creation of synthetic assets, enabling its system users to create any synthetic assets that are imaginable.

Galactic is on an overarching mission to democratize global access to investment assets through the power of DeFi. It is in Galactic’s long-term vision to:

1) Create a truly inclusive, frictionless, borderless, highly secure, low-cost, private, and censorship-resistant DEX
2) Provide and allow the permissionless creation of a galaxy of assets for users to seamlessly trade and manage portfolio exposures on one single platform
3) Enhance blockchain and DeFi adoption by allowing the crypto community to gain real world asset exposures, as well as bringing the benefits of blockchain to people that are still outside of the existing crypto community

2. CRYPTO SYNTHETIC ASSETS

2.1 What are crypto synthetic assets?

Crypto synthetic assets are cryptocurrency-based derivatives that aim to provide its holders asset exposures without needing to hold the underlying asset. The underlying asset types could range from digital assets such as cryptocurrencies, to real-world assets such as fiat currencies, equities, and commodities. The price of the synthetic asset is pegged to the underlying asset, and is retrieved by a decentralized price oracle.

2.2 The benefits of crypto synthetic assets

The traditional access to the global financial system has been made unequal due to the differences in regulations and financial systems. A non-US resident would often have restricted access to the US stock market due to financial and capital restrictions, and vice versa. While cryptocurrencies
are unbound by centralized organizations such as governments and financial institutions, trading activities on existing DEXs have often been limited to exchanges within the cryptocurrency spectrum. This results in a largely disconnected digital world from the physical world and therefore limiting the utilities and adoption of blockchain technology.

Crypto synthetic assets can broaden the utilities and applications of blockchain by leveraging on the following key benefits:

1) **Global liquidity pools and market participation**
   A cryptocurrency holder can gain portfolio exposures to global assets through crypto synthetic assets. For example, an investor will no longer need to own any fiat USD to gain asset exposure to Tesla’s stocks. Cryptocurrency holders can also diversify their portfolio exposures to assets outside of the crypto industry without leaving the digital world.

2) **Low cost and permissionless asset creation**
   Benefitting from the permissionless nature of blockchain technology, the creation of synthetic assets is no longer a specialty that only belongs to established financial institutions. Instead, everyone will have the tools required to create synthetic assets, and the cost of creation and contract settlements will be reduced significantly.

3) **Decentralized and non-custodial**
   There are no central authorities or intermediaries that hold on to the user’s synthetic assets on DEXs, reducing the risks of manipulation and exchange hacks.

3. **COLLATERALIZATION**

3.1. **Staking collaterals and minting Gals**

The Galactic protocol will be able to adopt various major cryptocurrencies as the base collateral to mint gUSD via Quasar - Galactic’s native dAPP that builds the platform’s Collateralization Pool. To start, Quasar will be able to accept wBTC, ETH, and BNB as collateral assets – other crypto collateral asset options will be added in the future. The subsequent decisions on which cryptocurrencies can be added as collateral options will be voted by the GalacticDAO community.

The minted gUSD can be subsequently used to convert to various Gals that are available on the Galactic platform, e.g., gTSLA, which will all be backed by the Collateralization Pool. First time Galactic stakers will need to lock up 200 gUSD as deposit to compensate Liquidators in case of a potential liquidation event. Stakers can also choose to become a Stability Provider by staking gUSD into the Stability Pool.
3.2. Collateralization ratio

The Galactic system has a varied minimum collateralization ratio associated with each collateral asset accepted by the system. While Galactic will require that debt positions are overcollateralized to ensure system’s stability in case of adverse price shocks to the underlying collateral assets, the minimum collateralization ratio it requires will be substantially lower than other peer-to-pool synthetic protocols that exist in the market thanks to the built-in dual-step liquidation mechanism. The required minimum collateralization ratios will also be reviewed regularly and decided by the GalacticDAO community.

As the total value of the Collateralization Pool fluctuates, the staker’s collateralization ratio will fluctuate accordingly. In the event that the staker’s individual collateralization ratio falls below the minimum level required by the system, the built-in liquidation mechanism will be triggered, and the staker will lose their staked collaterals and the 200 gUSD deposit to compensate the Liquidators and other stakers in the system. Stakers can adjust their collateralization ratios by repaying and burning Gals if it’s too low, or by minting more Gals if it’s too high.

4. GALACTIC’S DEBT POOL

4.1 The Debt Pool as a pooled counterparty for exchanges of Gals

When stakers mint gUSD they automatically incur a debt with a value that is equivalent to the total amount of the gUSD they minted, proportionately enrolling them into the aggregated Galactic’s Debt Pool. The aggregated Debt Pool will act as a pooled counterparty for exchanges of Gals on Galactic Exchange. As a result, the total value of the aggregated Debt Pool will increase if traders on the Exchange make profit, and will decrease if traders make losses. The individual staker’s debt value will also fluctuate proportionately to the aggregated Debt Pool. In essence, Galactic stakers are liquidity providers that provide infinite liquidity with zero slippage for Gals on the Galactic platform. In return, stakers can claim a share of the transaction fee that is proportionate to their share in the aggregate Debt Pool as rewards for their risks on a weekly basis in GALA tokens, which can only be unlocked and redeemed after 12 months.

4.2 Redeeming rewards, withdrawing collateral, and burning debt

In order to withdraw the staked collateral and redeem claimed rewards, stakers will need to repay and burn the amount of gUSD they owe first. Should the debt the individual staker owes fluctuates, they will need to burn more or less gUSD than they originally minted.
In addition, users will need to pay 0.5% – 5% of the redeemed amount in the form of GALA tokens as redemption fee. The exact percentage of the redemption fee will depend on i) the total number of system redeemers at the given time, and ii) the user’s redemption frequency.

5. GALACTIC DECENTRALIZED EXCHANGE (DEX) KEY FEATURES

5.1 Decentralized access to Galactic Exchange

In order to ensure a high-level of decentralization and censorship-resistance, the Galactic development team will not be running its own system frontend to provide users access to Galactic Exchange in the long-run. Instead, the Team will provide a series of system API interfaces and a well-prepared SDK for third party development teams.

To access Galactic Exchange, users will need to use the frontend portals provided by one of the third party Frontend Operators. The protocol will pay out rewards to Frontend Operators, and the rewards received by the Frontend Operators will grow proportionately according to total transaction fees generated through their portals.

5.2 Layer-2 solution

Galactic will be built based on Ethereum Layer-2. The use of Layer-2 technology solves the scalability problems of existing public chain transactions, and ensures that transactions can be facilitated at low cost, high speed, and a strong level of decentralization and security.

5.3 Available synthetic asset types

In the first phase of the project, the Galactic system plans to deploy 5 major synthetic asset types to trade on the Exchange. These asset types include cryptocurrencies, NFTs, equities, and fiat currencies (FOREX).

5.4 Exchange

In contrast to traditional CEXs or DEXs that match trades based on order books, users trade against a collateralized Debt Pool instead of trading against another user as a counterparty. The asset prices that users trade on are based on price feeds retrieved by external decentralized oracles. Every time a trade is made, a 0.3% transaction fee is charged by the system to the user.

5.5 Transaction Fee

Within the 0.3% transaction fee, 0.05% will be contributed to the Galactic Development team as
funds to buy and burn GALA from the public market to contribute to a deflationary GALA token economy.

The remaining 0.25% of the transaction fee will be distributed to Galactic stakers pro rata to their share of the Debt Pool.

5.6 Oracle

Oracle refers to the use of an external quotation system to feed the prices of different synthetic assets that Gals represent onto the Galactic chain. Given that trading activities have substantially high requirements for instantaneous price updates, conventional oracle machines are restricted by price delays caused by scalability challenges that are inherent in Layer 1 protocol, resulting in unfair system exploitation potential for price arbitrage.

Galactic’s Layer 2 oracle plans to adopt the latest design ideas of rollup scaling solutions. Compared with conventional Layer 1 oracle’s fragmented price feeds, Layer 2 oracle price feed will adopt a rollup design to facilitate significantly more seamless price feeds.

For example, assuming that the current Layer 1 oracle price feed system pulls price information every 15s block time. The Layer 2 oracle will pull prices every 100ms block time, which will in turn generate 150 price feed fragments when packaged and rolled onto Layer 1 through on-chain compression.

6. THE STABILITY POOL AND THE DUAL-STEP LIQUIDATION MECHANISM

When the staker’s collateralization ratio falls below the Liquidation Threshold either because of i) falling value of collateral assets; or ii) increasing value of the staker’s share of the Debt Pool, the Galactic system will trigger the liquidation process.

In order to ensure system solvency, Galactic adopts a dual-step liquidation mechanism:

**Step-1: Repaying undercollateralized debt using the Stability Pool**

The Stability Pool acts as the first line of defence for undercollateralized debt positions. Galactic stakers can choose to stake gUSD into the Stability Pool to become Stability Providers. The total value of the Stability Pool will be capped at 30% of the total value of the Debt Pool to prevent a shortage of gUSD in market as a result of excessive staking into the Stability Pool.

When a liquidation event is triggered, the same amount of gUSD will be repaid and burnt to write-off the undercollateralized debt positions. In return, 99.5% of the debtor’s collateral will be
transferred to stakers of the Stability Pool, while the remaining 0.5% to the Liquidator. The Liquidator will also be given the debtor's 200 gUSD deposit to compensate for the liquidation gas fee.

Since a liquidation event is triggered when the collateralization ratio is just below the required minimum collateralization ratio and above 100% due to overcollateralization, it is with a very high probability that the collateral received by the stakers in the Stability Pool is more than the contribution that is paid to burn the undercollateralized debt positions.

**Step-2: Redistributing undercollateralized debt to other Galactic stakers**

In the potential event that the total funds in the Stability Pool is insufficient to cover the undercollateralized debt positions, the system will redistribute the remaining undercollateralized debt positions to Galactic stakers with healthy collateralization ratios. The associated collaterals will also be redistributed to the stakers as compensation in the same manner.

**7. GALACTIC SYSTEM PARTICIPANT REWARDS**

Galactic will reward system participants and contributors via GALA tokens. These rewards include:

1. **Transaction fees**

   0.25% from the 0.3% transaction fee will be redistributed to GALA stakers pro rata to their share in the Debt Pool.

2. **Redemption fees**

   When users redeem rewards and collaterals from the system, they will need to pay 0.5% - 5% of the redeemed amount as redemption fee to the system. The redemption fees will be redistributed to GALA stakers pro rata to their share in the Debt Pool.

3. **Frontend operator fees**

   During Galactic’s project initial launch, a fixed amount of GALA tokens will be set aside to redistribute to Frontend Operators on a diminishing rate to incentivize system promotion and maintenance in the project’s early phase. The redistribution amount will be pro rata to the total value of gUSD minted via operator’s portal as a proportion to the total system’s Debt Pool. As adoption gradually increases in the later phase, transaction fee uplifts will become Frontend Operators’ main source of compensation.
Additional rewards in the form of gUSD and staked collaterals will be provided to Stability Providers and Liquidators.

8. GOVERNANCE

After Galactic protocol’s launch, the protocol’s governance will be passed onto the community-driven GalacticDAO. Proposals will be submitted to the community, and important decisions on parameters and system designs will be made under a voting basis.